LDN LOW DRIFT NOZZLE
A Versatile Sprinkler with LEPA Bubbler and Spray Deflector Options

AGRICULTURAL IRRIGATION
Low Pressure - High Performance
OUR MOST VERSATILE SPRAY NOZZLE

The LDN Low Drift Nozzle offers growers multiple ways to irrigate. One applicator can be used for LEPA applications, spray irrigation, and chemigation. With so many options available, growers can get precise control of their sprinklers’ droplet size, trajectory, and application pattern. This makes the LDN capable of adapting to various crop, environmental, and soil requirements.

LDN FEATURES

ULTRA LOW PRESSURE
Low pressure operation saves energy:
6 to 20 psi (0.41 to 1.38 bar)

MULTIPLE MODELS
Available with LEPA bubblers, single, double or triple pads, chemigation pads; a part-circle and a drag hose add-on

STREAMLINED DESIGN
Streamlined body and impact resistant materials can handle the rigors of traveling through tall crops

UP3 NOZZLES
Convenient UP3 nozzles for easy cleaning or changing.
Just pinch and pull, then place and click

TWO YEAR WARRANTY
Two-year warranty on materials, workmanship and performance
Maximize the Efficiency of your Irrigation Systems

LEPA (Low Energy Precision Application) Close Spacing is a water-efficient irrigation practice that relies on bubble applicators. LEPA systems gently deliver water from a height of 8 to 18 inches (20 to 46 cm) above the ground, without spraying, to combat wind-drift and prevent evaporation loss. Researchers and growers have found that with LEPA heads, at least 20%* more water reaches the soil than with conventional spray nozzles.

Unlike traditional LEPA systems, where sprinklers are placed 60 to 80 (152 to 2013 cm) inches apart to irrigate every other furrow, the Close Spacing method distributes water over most of the soil surface with 40 inches (1 m) or less between heads. Conservation tillage practices further help prevent evaporation loss, and run-off by holding the water in the rows until the soil can absorb it. As a result, Close Spacing achieves application efficiencies typically exceeding 95%.

*Source: LEPA Conversion and Management by Dr. Guy Flips and Leon New.

FEATURES

① Prevents wind-drift and evaporation loss
② Avoids wetting the plant canopy in row crops
③ Achieves a more uniform root zone coverage
④ Applies the water needed in fewer pivot passes
⑤ Can increase yield using less water - 0.27 to 21.18 gpm (61 to 4168 L/hr)
⑥ Low pressures operation of 6 to 20 psi (0.41 to 1.38 bar) can reduce pumping costs
⑦ Ideal for both high and low profile crops
⑧ Qualifies for government funding in select areas
⑨ Reduces the potential rodent damage to crop and equipment over drip systems

FOR OPTIMUM RESULTS, INCORPORATE:

① Tight Spacing - 40 inches (1 m) or less between sprinkler heads
② Sprinkler Height - 8 to 18 inches (20 to 46 cm) above the ground
③ Conservation Tillage - to increase surface storage capacity and improve filtration
④ Level Fields - ideal maximum slope is 1%
⑤ Filtration - for smaller nozzles
⑥ Soil Moisture Monitoring - to help reduce deep percolation losses

See nozzle chart on page 15 for mesh recommendations.
LDN LEPA PAD ASSEMBLY OPTIONS

- Zinc Weight
- Magnum Weight
- LDN Shroud
- LDN Shroud Bubble Spacer-UP3 (Used in place of weight)
- LDN-UP3 Bracket

LDN PAD WITH BUBBLE INSERTS (Shroud required)

<table>
<thead>
<tr>
<th>Concave Pads (CC)</th>
<th>Convex Pads (CV)</th>
<th>Flat Pads (FL)</th>
<th>Germination Pads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beige bubble Insert</td>
<td>Green</td>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>Red CM1 insert</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LDN BUBBLER PAD ASSEMBLIES (Shroud not required)

Small 12-grooved pads available (Used with UP3 Nozzles #2, #2.5, #3, #3.5, #4, #4.5). 120-Mesh Filtration Recommended.

Bubble Recommendations
Flow: 0.27 to 18.35 gpm (61 to 4168 L/hr)
Pressure: 6 to 15 psi (0.41 to 1.03 bar)
#4 - 26 Nozzles

LDN SHROUD AND BUBBLE INSERTS

The Shroud is used in conjunction with deflector pads containing a bubbler insert. You can choose either the beige bubble pad insert or the red CM1 pad insert opposite a variety of spray deflector pads. The spray and bubble pad combination allows for easy conversion between spray and LEPA irrigation. The Shroud deflects the water from the bubbler insert down in a gentle dome-shaped pattern, providing complete coverage of the field. Due to its less concentrated distribution pattern, the Shroud can be used on fields without furrows and is often used for germination as well as irrigation.

LDN UP3 BUBBLER PAD ASSEMBLY

The bubbler side of the deflector pad gently deposits water onto the soil surface in a bubbling stream. This aerated cascading stream resists the effects of wind and evaporation.
LDN SINGLE PAD

Single Pad Trajectories:

- **CONCAVE** (blue)
- **FLAT** (black)
- **CONVEX** (green)

EASY CONVERSION TO AND FROM SPRAY IRRIGATION

For spray irrigation with either the LDN Bubbler Assembly or the LDN with the Shroud, simply twist and unlock the deflector pad. Flip it over and twist to lock it back in place.

The LDN is incredibly versatile thanks to its various deflector pad options. The surfaces of the deflector pads (smooth, grooved, medium groove, or deep groove) each deliver a different spray pattern and droplet size. Each surface is also available in three basic geometries based on the desired trajectory of throw – flat (black), concave (blue) for a slightly upward spray, and convex (green) for a slightly downward spray.

- **SMOOTH**
  - Fine Droplets
  - Tighter Soils
  - Nozzles #2 - 26

- **MEDIUM 12 GROOVE**
  - Medium Droplets
  - Medium Soils
  - Nozzles #2 - 9

- **33 GROOVE**
  - Medium Droplets
  - Medium Soils
  - Nozzles #4 - 26

- **24 DEEP GROOVE**
  - Larger Droplets
  - Looser Soils
  - Nozzles #4 - #26

FOR OPTIMUM RESULTS, INCORPORATE:

Ball Valve – for easy water shut-off when converting between spray, LEPA and chemigation mode

*Ball Valve requires F x M adapter when installed over a weight.*
CHEMIGATION CONVERSION

The LDN offers chemigation pad inserts for corn or cotton. These are designed to produce an upward spray under the crop canopy to wash the underside of the leaves, where pests might hide. To change from irrigation to chemigation mode, simply twist and unlock the deflector pad. Flip it over and twist to lock it back in place. Any LDN Pad can be backed with a corn chemigation pad or a cotton chemigation pad insert.

Note: The LDN is not recommended for surface water or effluent applications.

<table>
<thead>
<tr>
<th>LDN DESIGN CRITERIA</th>
<th>Single Mini Pad 12 groove</th>
<th>Single Pad 24 Deep Groove</th>
<th>Single Pad 33 Groove</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle sizes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>#4 1/16” (1.59 mm)</td>
<td>#4 1/16” (1.59 mm)</td>
<td>#10 5/64” (3.97 mm)</td>
</tr>
<tr>
<td>Maximum*</td>
<td>#9 5/32” (3.97 mm)</td>
<td>#26 13/32” (10.32 mm)</td>
<td>#26 13/32” (10.32 mm)</td>
</tr>
<tr>
<td>Flows</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>0.27 gpm (61 L/hr)</td>
<td>0.27 gpm (61 L/hr)</td>
<td>1.74 gpm (395 L/hr)</td>
</tr>
<tr>
<td>Maximum</td>
<td>2.56 gpm (581 L/hr)</td>
<td>21.18 gpm (4811 L/hr)</td>
<td>21.18 gpm (4811 L/hr)</td>
</tr>
<tr>
<td>Maximum Spacing at 6 ft (1.8 m) ground clearance</td>
<td>10 ft (3.0 m)</td>
<td>10 ft (3.0 m)</td>
<td>10 ft (3.0 m)</td>
</tr>
<tr>
<td>Pressure at the Nozzle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>6 psi (0.41 bar)</td>
<td>6 psi (0.41 bar)</td>
<td>6 psi (0.41 bar)</td>
</tr>
<tr>
<td>Maximum</td>
<td>20 psi (1.38 bar)</td>
<td>20 psi (1.38 bar)</td>
<td>20 psi (1.38 bar)</td>
</tr>
</tbody>
</table>
Maximum Nozzle Throw

Note: Nozzle sizes are in 64th of an inch. For example: #12 nozzle = 12/64 inch = 3/16 inch.
MULTIPLE PADS

**MULTIPLE PAD OPTIONS**

“The LDN was the first spray nozzle for pivots to let irrigators stack multiple pads on one applicator. Each additional pad has extra grooves that divide larger flows into multiple streams, allowing the LDN to distribute water more efficiently along the length of the pivot.

Larger flows can flood a single pad, so the additional streams help eliminate small droplets, reduce wind-drift, and maintain pattern uniformity.

Since the LDN uses multiple pads and deflectors, the diameter of coverage you can achieve with the LDN is incredibly flexible. Each pad has its own trajectory and distance throw, so water isn’t concentrating in one place at any time.

Use the chart below to help you determine if you need double or triple pads, based on your nozzle size.”
The Senninger Part-Circle LDN is specifically designed to distribute water away from wheel tracks to minimize rut depth.

**FEATURES**

1. Can be used in conjunction with standard full circle LDNs or other Senninger sprinklers on the remainder of a pivot.
2. Distributes water in a 170° pattern with 17 streams at a 10° trajectory for minimum evaporative loss.
3. Maximum radius of throw - up to 29 ft (8.8 m).

*Dual Nozzle Carrier available see pg. 10*

---

**LDN PART-CIRCLE DESIGN CRITERIA**

<table>
<thead>
<tr>
<th>Nozzle sizes</th>
<th>Part-Circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>#6 3/32” (2.38 mm)</td>
</tr>
<tr>
<td>Maximum*</td>
<td>#18 9/32” (7.14 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum at 3 ft (0.91 m)</td>
</tr>
<tr>
<td>Maximum at 3 ft (0.91 m)</td>
</tr>
<tr>
<td>Minimum at 6 ft (1.83 m)</td>
</tr>
<tr>
<td>Maximum at 6 ft (1.83 m)</td>
</tr>
<tr>
<td>Minimum at 9 ft (2.74 m)</td>
</tr>
<tr>
<td>Maximum at 9 ft (2.74 m)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure at Nozzle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
</tbody>
</table>

*It is recommended that larger nozzle sizes be used only on soils that can handle higher application rates.*

---

**THE PART-CIRCLE LDN DISTRIBUTES WATER AWAY FROM WHEEL TRACKS.**

For use on rigid drops only. Distribution pattern varies by nozzle size and pressure.

Mount the Part-Circle LDN to spray away from the towers regardless of the direction of the pivot.

Mount the Part-Circle LDN to spray in the opposite direction the pivot is traveling.
INSTALLATION
• The LDN can be mounted on flexible hose drops or rigid Polyethylene or galvanized steel drops.
• When using flexible hose drops, a weight is recommended.
• When using The One Weight, use the internal fit technology to nest the weight onto the base of the LDN.
• Conventional slip-over weights can be used with the LDN.
• When using Senninger goosenecks with rigid drops, maximum length should not exceed 1 ft (0.3 m) below truss rod.
• The LDN can be mounted between 1.5 to 9 ft (0.46 to 2.74 m) above the ground.
• Pressure regulators can be installed at the top of the drop, or near the applicator.
• Always follow your customized printout for proper pressure regulator placement.

125º SINGLE GOOSENECK
(¼ inch barb)

125º DOUBLE GOOSENECK
(¼ inch barb)

180º SINGLE GOOSENECK
(¼ inch barb)
Components

**PRESSURE REGULATORS**

<table>
<thead>
<tr>
<th>PRL - Low Flow</th>
<th>PMR - Medium Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="PRL.png" alt="Image" /></td>
<td><img src="PMR.png" alt="Image" /></td>
</tr>
<tr>
<td>Ask about the patented PSR-2 for systems pumping surface water!</td>
<td></td>
</tr>
</tbody>
</table>

Pressure regulators enable applicators to operate properly. With low pressure systems, any fluctuations can significantly impact system performance. Higher pressures can create small droplets susceptible to wind-drift, misting and evaporation. Pressure regulators can be installed at the top of the drop or directly above the applicator. A Senninger Pressure Drop can be installed at the end of the pivot just above the bubbler head to help verify system design pressure.

**SENNINGER WEIGHTS**

Senninger weights provide stability on flexible hose drops for a number of pivot applicators. The unique fit technology allows the weight to fit securely onto the i-Wob, Xi-Wob, LDN, Super Spray, and even some other manufacturer’s applicators. The weight’s easy-to-install design lets it remain on the applicator during nozzle changes. The One Weight is constructed entirely of zinc alloy and the Magnum Weight is constructed of UV-resistant thermoplastic to prevent corrosion and deter metal theft.

**DRAG HOSE ADAPTER**

The LDN can be used with a drag hose to apply water directly into the furrow. The drag hose adapter is easy to install, snapping right onto the LDN bracket like the LDN pads.

**BALL VALVE**

The dial shut-off knob makes changing or cleaning sprinklers and spray nozzles easy while the system is still operating. The Ball Valve has a streamlined design reduces snagging and unintentional operation. It has a smooth bore interior to maximize bi-directional flow efficiency.

**GOOSENECKS**

Use only with Truss Rod Hose Slings

180º Single
125º Double
125º Single

Senninger 180 and 125-degree goosenecks are constructed of non-corrosive, UV-resistant thermoplastic materials for long life and reduced plugging. 125-degree single or double models are used with Truss Rod Hose Slings. Goosenecks offer installation options for either NPT or hose barb outlets.

**TRUSS ROD HOSE SLINGS**

Truss Rod Hose Slings securely fasten a ¾” flexible hose to the truss rod to maintain drop/sprinkler position. Supporting the flexible hose of the drop prevents kinking and abrasive wear. Color-coded models are available for various truss rod sizes: 5/8” (rust), 11/16” (green), 3/4” (black), 13/16” (grey), and 7/8” (blue).

**WATER PATTERNS**

Conventional Applicators

Single 125º Goosenecks (with Truss Rod Hose Slings)

Double 125º Goosenecks (with Truss Rod Hose Slings)

**UP3 DUAL NOZZLE FITTING**

Designed to be used instead of a standard barb x threaded fitting, this device carries two additional UP3 nozzles. Just pinch and pull to remove nozzles and place and click to reinstall. Nozzles are easily identifiable with numbers on the ears. The larger the number, the higher the flow.

**UP3 DUAL NOZZLE CARRIER**

To access the secondary nozzle, pinch and pull the nozzle from the applicator, flip the carrier over and click in the secondary nozzle. The carrier is marked to indicate high and low flow nozzles. When installed in the applicator, if HIGH is visible on the carrier, then the lower flow nozzle in in use. If LOW is visible on the carrier, the higher flow nozzle is in use. (Cannot be used with the LDN Shroud)
The nozzle numbers (corresponding to orifice sizes in 64ths of an inch) are visible on the ears. Nozzles are warranted to maintain correct orifice size for five years.

### EASYTE-CLEAN / EASY-CHANGE NOZZLE DESIGN (Patented)

The Sensinger easy change nozzle was introduced in 2008. Just pinch and pull to remove the nozzle then place and click to reinstall. There is no need to disassemble or remove the sprinkler for cleaning or changing nozzles.

Nozzle numbers (corresponding to orifice sizes in 64ths of an inch) are visible on the ears. Nozzles are warranted to maintain correct orifice size for five years.

<table>
<thead>
<tr>
<th>Nozzle #</th>
<th>Nozzle color</th>
<th>Nozzle Size</th>
<th>6 psi 0.41 bar</th>
<th>10 psi 0.63 bar</th>
<th>15 psi 1.03 bar</th>
<th>20 psi 1.38 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>gpm (L/hr)</td>
<td>gpm (L/hr)</td>
<td>gpm (L/hr)</td>
<td>gpm (L/hr)</td>
</tr>
<tr>
<td>#2 Pink</td>
<td>#4*</td>
<td>7/64&quot;</td>
<td>0.34</td>
<td>0.20</td>
<td>0.11</td>
<td>0.04</td>
</tr>
<tr>
<td>#3 Ice</td>
<td>#3/4*</td>
<td>15/64&quot;</td>
<td>0.36</td>
<td>0.22</td>
<td>0.12</td>
<td>0.05</td>
</tr>
<tr>
<td>#4 Light Blue</td>
<td>#5/8*</td>
<td>21/64&quot;</td>
<td>0.42</td>
<td>0.27</td>
<td>0.14</td>
<td>0.06</td>
</tr>
<tr>
<td>#5 Beige</td>
<td>#7/8*</td>
<td>25/64&quot;</td>
<td>0.44</td>
<td>0.29</td>
<td>0.15</td>
<td>0.07</td>
</tr>
<tr>
<td>#6 Gold</td>
<td>#9/16*</td>
<td>29/64&quot;</td>
<td>0.46</td>
<td>0.30</td>
<td>0.17</td>
<td>0.08</td>
</tr>
<tr>
<td>#7 Lime</td>
<td>#11/16*</td>
<td>33/64&quot;</td>
<td>0.48</td>
<td>0.32</td>
<td>0.19</td>
<td>0.09</td>
</tr>
<tr>
<td>#8 Lavender</td>
<td>#13/16*</td>
<td>37/64&quot;</td>
<td>0.50</td>
<td>0.34</td>
<td>0.21</td>
<td>0.10</td>
</tr>
<tr>
<td>#9 Grey</td>
<td>#15/16*</td>
<td>41/64&quot;</td>
<td>0.52</td>
<td>0.36</td>
<td>0.23</td>
<td>0.11</td>
</tr>
<tr>
<td>#10 Turquoise</td>
<td>#17/16*</td>
<td>45/64&quot;</td>
<td>0.54</td>
<td>0.38</td>
<td>0.25</td>
<td>0.12</td>
</tr>
<tr>
<td>#11 Yellow</td>
<td>#19/16*</td>
<td>49/64&quot;</td>
<td>0.56</td>
<td>0.40</td>
<td>0.27</td>
<td>0.13</td>
</tr>
<tr>
<td>#12 Red</td>
<td>#21/16*</td>
<td>53/64&quot;</td>
<td>0.58</td>
<td>0.42</td>
<td>0.29</td>
<td>0.14</td>
</tr>
<tr>
<td>#13 White</td>
<td>#23/16*</td>
<td>57/64&quot;</td>
<td>0.60</td>
<td>0.44</td>
<td>0.31</td>
<td>0.15</td>
</tr>
<tr>
<td>#14 Blue</td>
<td>#25/16*</td>
<td>61/64&quot;</td>
<td>0.62</td>
<td>0.46</td>
<td>0.33</td>
<td>0.16</td>
</tr>
<tr>
<td>#15 Dk. Brown</td>
<td>#27/16*</td>
<td>65/64&quot;</td>
<td>0.64</td>
<td>0.48</td>
<td>0.35</td>
<td>0.17</td>
</tr>
<tr>
<td>#16 Orange</td>
<td>#29/16*</td>
<td>69/64&quot;</td>
<td>0.66</td>
<td>0.50</td>
<td>0.37</td>
<td>0.19</td>
</tr>
<tr>
<td>#17 Dk. Green</td>
<td>#31/16*</td>
<td>73/64&quot;</td>
<td>0.68</td>
<td>0.52</td>
<td>0.39</td>
<td>0.20</td>
</tr>
<tr>
<td>#19 Black</td>
<td>#33/16*</td>
<td>77/64&quot;</td>
<td>0.70</td>
<td>0.54</td>
<td>0.41</td>
<td>0.21</td>
</tr>
<tr>
<td>#20 Dk. Turquoise</td>
<td>#35/16*</td>
<td>81/64&quot;</td>
<td>0.72</td>
<td>0.56</td>
<td>0.43</td>
<td>0.23</td>
</tr>
<tr>
<td>#21 Mustard</td>
<td>#37/16*</td>
<td>85/64&quot;</td>
<td>0.74</td>
<td>0.58</td>
<td>0.45</td>
<td>0.25</td>
</tr>
<tr>
<td>#22 Maroon</td>
<td>#39/16*</td>
<td>89/64&quot;</td>
<td>0.76</td>
<td>0.60</td>
<td>0.47</td>
<td>0.27</td>
</tr>
<tr>
<td>#23 Cream</td>
<td>#41/16*</td>
<td>93/64&quot;</td>
<td>0.78</td>
<td>0.62</td>
<td>0.49</td>
<td>0.29</td>
</tr>
<tr>
<td>#24 Dk. Blue</td>
<td>#43/16*</td>
<td>97/64&quot;</td>
<td>0.80</td>
<td>0.64</td>
<td>0.51</td>
<td>0.30</td>
</tr>
<tr>
<td>#25 Copper</td>
<td>#45/16*</td>
<td>101/64&quot;</td>
<td>0.82</td>
<td>0.66</td>
<td>0.53</td>
<td>0.32</td>
</tr>
<tr>
<td>#26 Bronze</td>
<td>#47/16*</td>
<td>105/64&quot;</td>
<td>0.84</td>
<td>0.68</td>
<td>0.55</td>
<td>0.33</td>
</tr>
</tbody>
</table>

**SMALL UP3 NOZZLES AND PADS**

Small nozzles and mini-deflector pads are designed as an option for the first spans of a machine where over-watering is an issue. These nozzles and pads are ideal for low pressures up to 15 psi (1.03 bar). Due to the small orifice size of nozzles #2 through #4.5, filtration of 120-mesh will be needed.
Senninger’s commitment to world-class products, local support and technical expertise ensure we provide the most efficient and reliable agricultural irrigation solutions available in the world today.

Steve Abernethy, President of Senninger Irrigation